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Arctic Gas

ARCTIC GAS BACKGROUND BRIEF

Prepared for the Parliamentary Standing Committee on National Resources and Public Works, by Canadian Arctic Gas Pipeline Limited, May 29, 1975

THE ARCTIC GAS PROJECT

Canadian Arctic Gas Pipeline Limited and its affiliate, Alaskan Arctic Gas Pipeline Company, are sponsored by 10 Canadian and eight U.S. firms, representing a major portion of the natural gas utility industry in both countries, in addition to major oil companies and the Canada Development Corporation.

The participants are:

Majority-owned Canadian companies:

- Alberta Natural Gas Company Limited
- Canada Development Corporation
- The Consumers' Gas Company
- Northern and Central Gas Corporation Limited
- TransCanada PipeLines Limited
- Union Gas Limited

Minority-owned Canadian companies:

- Canadian Superior Oil Limited
- Gulf Oil Canada Limited
- Imperial Oil Limited
- Shell Canada Limited

Non-Canadian owned companies:

- Atlantic Richfield Company
- The Columbia Gas Transmission Corporation
- Michigan Wisconsin Pipe Line Company
- Natural Gas Pipeline Company of America
- Northern Natural Gas Company
- Pacific Lighting Gas Development Company
- Panhandle Eastern Pipe Line Company
- Texas Eastern Transmission Corporation

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Initial studies in what is now the largest single industrial research and development program in Canada's history began in 1968. Expenditures to date total $80 million, and may exceed $100 million by the end of this year. Included are all of the engineering, economic, environmental and socio-economic aspects of the proposed Arctic Gas pipeline to transport natural gas from both the Mackenzie Delta and Alaskan North Slope regions. Northern wildlife and vegetative studies alone have cost more than $12 million.

The Arctic Gas system would include 200 miles of pipeline across northern Alaska to be owned and operated by Alaskan Arctic Gas, and 2,400 miles across northern and western Canada to be owned and operated by Canadian Arctic Gas, as shown on the accompanying map. By connecting with existing and planned pipelines, Arctic Gas would link natural gas supplies from northern Canada to Canadian consumers from Vancouver to Quebec, and Alaskan gas to U.S. consumers from the Pacific to the Atlantic seaboards. Main segment of the pipeline would be 48-inches in diameter, and fully-powered but unlooped would have a capacity of 4.5 billion cubic feet per day. The pipeline is incrementally expandable by adding further compression and line loops.

Including an allowance of $1.3 billion for escalation of costs beyond 1974 levels, total capital investment to complete the

Canadian Arctic Gas pipeline to a capacity of 3.25 bcf/d is estimated at $6.3 billion. Of this, approximately $700 million would be generated by initial operation of the pipeline from the Mackenzie Delta, leaving a balance of $5.6 billion to be raised from investors.

Seventy-five percent of the required financing, or $4.2 billion, would be debt capital; and 25 percent or $1.4 billion, would be equity. Majority Canadian ownership is planned and would require an equity investment by Canadians of just more than $700 million.

The financing plan calls for debt and equity investors to provide $1.5 billion in additional standby funds that could be called upon in the event of cost over-runs.

Funds needed to expand the capacity to a planned 4.5 bcf/d would be provided largely from the operation of the pipeline, and would require little additional financing.

Arctic Gas has secured conditional agreements from five of its majority Canadian-owned member firms to invest a total of $400 million in its equity and provide $144 million in additional standby funds. These funds have been conditionally committed for investment in Canadian Arctic Gas by the Canada Development Corporation, the Consumers' Gas Company, TransCanada Pipelines

Limited, and Union Gas Limited. A public offering of convertible debentures, combined with further investments by other Canadian corporations and financial institutions, will secure the objective of majority Canadian ownership and control.

A capital investment of $700 million will be required in Alaskan Arctic Gas to complete that company's 200-mile segment of the total system. It is expected that this will be financed by U.S. interests.

Operating at its initial capacity of 3.25 bcf/d, the tariff to move Mackenzie Delta gas through the Arctic Gas pipeline to a connection with TransCanada PipeLines on the Alberta-Saskatchewan boundary is estimated at 78 cents per mcf based on 1974 costs. At a capacity of 4.5 bcf/d and 1974 costs, the tariff declines to 71 cents per mcf. On the basis of estimated escalated costs, the tariffs are estimated at 96.5 cents per mcf and 89 cents per mcf, respectively.

The Arctic Gas pipeline would neither purchase nor own gas (except to fuel the pipeline) but would provide a transportation service as a contract carrier on a non-discriminatory basis for gas shippers in accordance with its tariff conditions. Canadian Arctic Gas, as an inter-provincial pipeline, would be subject to the regulatory control of the Government of Canada through the National Energy Board.

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Canadian Arctic Gas is managed by Canadians, with the head office located in Toronto, and the negineering and environmental research conducted out of the Calgary office. Offices are also maintained in Ottawa and Yellowknife. The Company has a staff of approximately 150, and some 40 consulting organizations are engaged. Offices for Alaskan Arctic Gas are maintained in Anchorage and Washington.

Arctic Gas represents a unique opportunity in that U.S. capital and gas supplies would help strengthen and expand the Canadian economy. Operation of the pipeline will generate substantial revenues, in part from the transportation of U.S. gas. Initially, the cash flow would be required for expansion of the pipeline as gas supplies and requirements grow, but ultimately billions of dollars would be available for investment by a Canadian-controlled company.

TIMING AND CURRENT STATUS

Given final government approvals early in 1976, natural gas supplies from the Mackenzie Delta can be available through the Arctic Gas pipeline by 1980. This can be accomplished if the governmental review and decision processes in Canada and the U.S. proceed expeditiously. Canadian Arctic Gas filed applications on March 21, 1974 with the National Energy Board for a certificate of public convenience and necessity, and with the Department of Indian Affairs and Northern Development for the use of Crown land for the pipeline right-of-way across northern Canada. More than 7,000 pages of detailed evidence from the Arctic Gas research and studies were filed in support of these applications. Additional evidence relating to costs and financing; national economic effects, and natural gas supply, were filed with the National Energy Board on November 15, 1974 and January 23, 1975.

Alaskan Arctic Gas, relative to the 200 miles of the system across northern Alaska, also filed on March 21, 1974 its applications to the U.S. Federal Power Commission for a certificate of public convenience and necessity, and to the U.S. Department of the Interior for the use of U.S. federal lands in Alaska.

In respect to the application to the Department of Indian Affairs and Northern Development, Mr. Justice Thomas Berger of the Supreme Court of British Columbia was appointed Commissioner of the Mackenzie Valley Pipeline Inquiry in March, last year. This Inquiry is charged with recommending terms and conditions to protect the northern environment and the interests of northern residents in any right-of-way permit that may be issued by the Government of Canada to Arctic Gas. Following preliminary hearings on procedural matters, formal hearings before Mr. Justice Berger's Inquiry commenced in Yellowknife on March 3, 1975.

The date for the start of hearings before the National Energy Board has not yet been announced. NEB hearings on the application by Canadian Arctic Gas may now be consolidated with hearings on the applications by Foothills PipeLines Limited et al for a Delta-only pipeline. Following initial applications and notice of intention, supporting evidence by Foothills and its affiliates was filed with the Board on May 1, 1975.

In the United States, formal hearings on the competing applications of Alaskan Arctic Gas and El Paso Natural Gas Company started in Washington on May 5, 1975.

As required by the U.S. National Environmental Protection Act, environmental impact statements related to Alaskan Arctic Gas are being prepared by the Federal Power Commission and the Department of the Interior.

The Department of the Interior is also examining the relative merits, from a U.S. viewpoint, of the competing Arctic Gas and El Paso projects, considering environmental, economic and security factors, and will report both to President Ford and to Congress. The report to Congress is required by November, 1975, under the mandate of 1973 amendments to the U.S. Mineral Leasing Act of 1920, which required the Department of the Interior to report on the feasibility of one or more gas or oil pipelines from the North Slope of Alaska to the lower 48 states through Canada.

Interior's report to the Administration was referred to by President Ford in his economic message to Congress on October 8, 1974. The President at that time said that this report would provide the information necessary for the U.S. Administration to determine which of the two alternative means of transporting its North Slope Gas is most in the interests of the U.S., and what legislation may be required to expedite the earliest possible access to North Slope gas.

THE NEED FOR NEW GAS SUPPLIES

The assurance of continuity of adequate domestic energy supplies, particularly natural gas, is important in maintaining and expanding Canadian industrial and economic activity.

Such activity, and the provision of energy supplies to fuel it, are needed to recover from presently depressed economic conditions. Only domestic resources can provide assurance of energy continuity. The vulnerability to shortages and supply disruptions that rapidly growing oil imports would impose has been amply demonstrated during recent years. In addition, in many instances, there are no readily available alternatives for natural gas. Adequate domestic gas supplies are needed to assure the requirements of residential and commercial users; as an industrial fuel in processing operations such as steel and glass making; and as a feedstock in petrochemical operations.

The outlook for Canadian gas supply and demand during the next 20 years was exhaustively assessed at public hearings before the National Energy Board which concluded early in March. More than one million words of testimony were presented in 40 days of hearings at six cities across Canada. The Board's assessment, based on this evidence and its own studies, is eagerly awaited.

The evidence presented at these hearings clearly suggests that gas supplies from western Canada will not be adequate to meet market growth requirements between now and 1980, the earliest that Mackenzie Delta gas could be made available. TransCanada PipeLines, which transports virtually all of the natural gas consumed in Canada east of Alberta, testified to the board that there are no real prospects of any net increase in Canadian gas supplies between now and 1980, and that even maintaining present sales volumes will be a tight squeeze.

The fact that there is not likely to be any increase in Canadian natural gas sales until Mackenzie Delta gas supplies can be made available, holds implications for an already serious national balance of payments problem.

In 1970, Canada's net foreign earnings from trade and other current business were $1.1 billion. Last year there was a deficit of $1.9 billion in the current account balance of payments. For this year, the deficit is estimated to exceed $4 billion. The addition of rapidly expanding oil import bills, unless averted by new oil and gas supplies to offset declining western production, could produce strains which would affect the economic well-being of every Canadian.

Canada is the only industrialized nation in the western world which presently produces as much energy as it consumes. As a result, we have not felt the full economic blast of soaring oil prices, one of the major causes of current universal economic difficulties. Last year, net crude oil exports generated nearly $800 million in foreign exchange earnings (nearly $1.2 billion, if refined petroleum products and liquid petroleum gases are included). But by 1980 declining oil production will result in a reversal in our annual crude oil trade forecast of nearly $3 billion, and by 1983, nearly $3.6 billion. This assumes a national program to reduce energy use (and thus reduce imports) through conservation measures. If no conservation of energy use were achieved, the forecast reversal from last year's crude oil trade surplus would be in the order of $3.4 billion by 1980, and $4.6 billion by 1983.

Any shortfall in natural gas supplies to meet potential domestic and existing export market requirements would result in further additions to these net oil import costs.

The anticipated shortfalls in domestic crude oil supplies are taken from tables and charts in the report of the National Energy Board last October, entitled "In the Matter of Exportation of Oil". After allowing for energy conservation, the inferred domestic crude oil demand and supply forecasts indicate that

production this year will exceed total Canadian demand by 50,000 barrels per day, and will fall short by 125,000 b/d next year. The shortfall rises to 600,000 b/d in 1980, and 800,000 b/d by 1983. At an assumed price of $10 per barrel, the cost of these net oil imports would be in the order of $2.2 billion in 1980, and $2.9 billion in 1983. Without conservation measures, the cost of forecast net oil imports would be $2.6 billion in 1980, and $3.8 billion in 1983, if domestic production is limited to the western provinces.

The forecast supply deficiencies, with and without energy conservation, as inferred from the Board's report, and the resulting net import costs at $10 per barrel, are shown on the following table.

DOMESTIC OIL SUPPLY BALANCE*

	with energy conservation		without energy conservation	
Year	Surplus or Deficiency 000 bbls/day	$ Millions	Surplus or Deficiency 000 bbls/day	$ Millions
1974	100	783	110	783
1975	50	180	50	180
1976	-125	-455	125	-455
1977	-270	-1,000	300	-1,100
1978	-390	-1,400	450	-1,640
1979	-510	-1,900	600	-2,200
1980	-600	-2,200	720	-2,600
1983	-800	-2,900	1,035	-3,800

* Excludes refined petroleum products and liquid petroleum gases (LNG). Source: Interpolated from NEB report, October/74 (except 1974 date).

The best hope of providing required additional gas supplies, and reducing the impending deficit in energy trade, lies with the natural gas reserves in the Delta area of the Mackenzie River, extending offshore into the waters of the Beaufort Sea.

The Geological Survey of Canada estimates this region to contain 90 trillion cubic feet of potential gas reserves, 50 tcf on land and the balance offshore. Geological consultants to Arctic Gas have estimated that the Delta and Beaufort sea areas have combined potential reserves well in excess of 50 tcf.

Active exploration has been underway in the Delta for nearly a decade, and Arctic Gas consultants estimate that approximately 6.5 trillion cubic feet can be produced from the fields discovered to the end of last year. Several hundred million dollars are being spent annually to find and develop more of the potential gas resources in the Delta and offshore area.

Planning for the Arctic Gas pipeline is based on an initial production volume of 1 to 1.25 bcf/d from the Delta in 1980, with increased volumes to be brought on as the potential reserves are developed. An initial supply volume of 1.25 bcf/d would have the effect of displacing 225,000 barrels per day of crude oil, for an annual savings of $900 million. The projected 1983 volume of 2.25 bcf/d would displace 400,000 b/d of oil imports for an annual saving of $1.5 billion.

ECONOMIC EFFECT

The proposed Arctic Gas pipeline will provide major contributions to the Canadian economy.

It will help provide the assured supplies of domestic energy, necessary to sustain industrial activity and employment; strengthen a primary resource industry which provides an important base for the secondary manufacturing, service and supply sectors; help correct chronic regional economic disparity in Northwestern Canada; improve Canada's foreign exchange position by reducing oil imports and by generating foreign earnings from the charges for transporting Alaskan gas.

The need for assured domestic supplies of natural gas -- for use as an industrial fuel, in processing operations such as steel making, and as a feedstock in petrochemical operations -- has already been noted.

It is our contention, as submitted in evidence to the National Energy Board, that "the most important national economic effect of the proposed Arctic Gas pipeline will be to relieve the constraints on Canada's future economic growth that would result from deficiences in the supply of energy from secure sources." We further submitted that "the demand/supply

situation for natural gas by itself provides a fundamental basis for concluding that the proposed pipeline is in the national interest and, indeed, that it should be considered a national economic priority."

The other economic benefits, however, are also important.

Primary resource industries, such as oil and gas exploration and production, have provided much of the impetus for the sustained growth of the Canadian economy during the past 30 years. They have provided a base for secondary manufacturing, service and supply industries; development of advanced Canadian technology and expertise with related export opportunities for Canadian manufacturers; enhancement of Canada's international competitive position as a result of utilizing a comparative advantage in the resource sector; and regional expansion of economic activity and opportunity. Many of these benefits have been derived from oil and gas exploration and development in the western provinces, but future opportunity here is becoming limited as exploration approaches the full potential of this western resource base. By providing a key to economic utilization of a new and large resource base in the far north, the pipeline will help extend and continue this chain of economic activity and benefits.

The opportunity for secondary but important economic benefits of this type is illustrated by one specific example related to the Arctic Gas pipeline. The transportation of Alaskan U.S. gas across Canada by a Canadian pipeline can, in effect, be considered an export service, since this will generate foreign earnings of hundreds of millions of dollars per year, but will require no export commitment of Canadian resources.

The economic contribution that Arctic Gas will make by improving Canada's balance of payments position has already been discussed.

The Arctic Gas pipeline will provide a major contribution to alleviating regional economic disparity in northern Canada by providing wage employment opportunities; enhancing the northern social and economic infrastructure, and providing natural gas service to northern communities. The number of long-term northern job opportunities generated directly and indirectly by the Arctic Gas pipeline is estimated in excess of 2,000 -- in a region with a population of 20,000 where the need for employment opportunities is urgent.

The northern need for the economic benefits which the pipeline can provide were summarized by counsel for Arctic Gas in our

opening statement to the Mackenzie Valley Pipeline Inquiry in Yellowknife on March 3, as follows:

"...the hard fact is that without some sort of economic development, the land - enormous, beautiful and awe inspiring as it is - is not now supporting the population of these Territories. The hard fact is that many northerners whose forebears lived off the land do not want to go back to the traditional means of making a livelihood. The hard fact is that at present there is insufficient economic activity in the North to give the opportunity to all those who seek wage employment to fulfill themselves in these Territories. Indeed, our evidence will show that a good deal of economic activity which is now taking place in the Territories is there by reason of the anticipation of the construction of this pipeline and that if the project were not to go forward, the pace of economic activity and the opportunities for job employment in the North would reduce to an extent which would work great hardship for a large proportion of the people now residing here.

"The North as a whole needs a sound and stable economic base which will provide wage employment to those who wish to seek it. Our submission is that the pipeline will provide that economic base without interfering with or restricting the freedom of choice of those Northerners who wish to earn their livelihood from the land."

An econometric analysis of the effects of the pipeline on the Canadian economy is outlined in a study performed for Arctic Gas by the University of Toronto's Institute for the Quantitative Analysis of Social and Economic Policy, and filed in our evidence to the board. The study employed a mathematical model of the Canadian economy, which has been under development and in use for a number of years at the Institute.

The econometric study measured economic effects in terms of employment, Gross National Product, balance of payments, exchange rate of the Canadian dollar, and domestic prices and costs. Total Canadian employment is estimated to increase as a result of the pipeline by 120,000 man years during the first five years following start of construction. The exchange value of the Canadian dollar is expected to be higher by 0.5 percent on average during this five-year period, and by 1.8 percent on average during the next five-year period. Anticipated gains are also measured in terms of Gross National Product and national income, with a minor reduction in the rate of increase in domestic prices attributed to the small appreciation in the exchange rate, given construction and operation of the pipeline.

Much of the economic effect during the construction period will come from the purchase of Canadian material, supplies and services. More than 70 percent of the total material supply and installation costs are expected to reflect Canadian content and Canadian taxes and duties.

ALTERNATIVE PROPOSALS

The alternative to the Arctic Gas proposal to combine the flow of Delta gas to Canadian consumers with the flow of Alaskan gas to U.S. consumers through a single pipeline is to build two separate transportation systems. One, as proposed by El Paso, would move North Slope gas by pipeline across Alaska for conversion to liquefied natural gas and shipment by tanker to California. The other, as proposed by Foothills PipeLines, would transport only Delta gas across northern and western Canada.

Two separate transportation systems would at least delay Canada's access to urgently required natural gas supplies, and would impose upon both countries, billions of dollars in additional transportation costs.

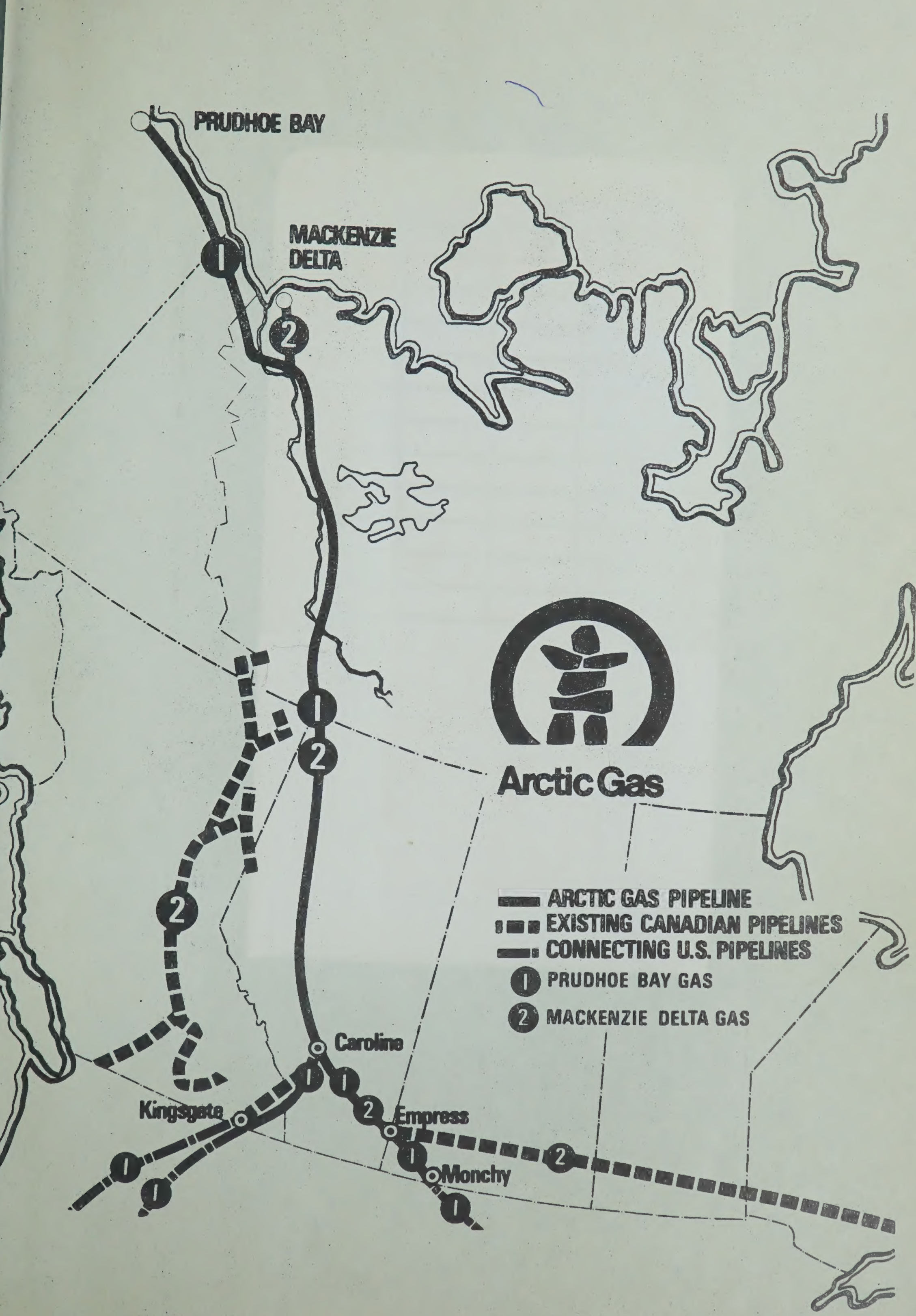
The proposed Delta-only system envisions a 42-inch diameter pipeline from the Mackenzie Delta with a planned capacity in the order of 2.5 billion cubic feet of gas per day. (It is not certain, however, when such a volume of gas will be available for transportation from the Delta). The higher-pressure, 48-inch diameter Arctic Gas pipeline, moving both Delta and North Slope gas, would have a corresponding capacity of 4.5 billion cubic feet per day. Thus the

proposed Delta-only pipeline would be 88 percent as large as the Arctic Gas pipeline, but at planned capacities could carry only 55 percent as much gas.

Of greater concern is the fact that a pipeline to transport only Mackenzie Delta gas would not be economically viable, nor could it be financed until such time as adequate reserves have been found to justify its construction and operation. Economic viability for a 42-inch pipeline from the Delta requires a volume of 15 to 18 trillion cubic feet of proved gas reserves available for transportation. Gas reserves found in the Delta region by 1975 totalled about 6.5 trillion cubic feet. Thus a Delta-only pipeline is economically feasible only at some unknown future time, and even then at greater transportation costs. A pipeline which combines both Mackenzie Delta and Alaskan North Slope reserves could be undertaken now, and expanded as additional volumes are developed.

A question of jurisdictional control is raised by the Foothills application. The jurisdictional question arises by virtue of the fact that the movement of gas across Alberta would be through facilities owned by a provincial company, Alberta Gas Trunk Line, which is subject to the regulatory control of the Alberta Government. Dual control, e.g. Federal and provincial, is a difficult and perplexing concept.

In summary, we believe that Arctic Gas represents the most timely and economical option for Canada in its pursuit of more domestic supplies of energy. Timeliness and economy of Delta gas are the two most important benefits of U.S. involvement in this project. The gas supply situation constitutes a national problem requiring nation-wide solutions in both Canada and the United States. Arctic Gas is one such solution -- in each country.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